Attachment B

Research

Research Project: Surveillance and Ecology of Mosquito, Biting and Filth Breeding Insects

Location: Mosquito and Fly Research Unit

Title: Analysis of Volatile Compounds Extracted from Molasses for Evaluation As Candidate Fly Attractants

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Technical Abstract: Introduction: House flies and other fly species can wound or injure farm animals causing weight loss or other deleterious effects resulting in a loss of revenue to farmers. Farm grade molasses used for cattle feed is a strong attractant to many species of flies seeking the sugars contained in the mixture as a food source. Sugars are not known to be volatile, so this study sought to identify volatile chemical components in molasses as candidate fly attractants. Once isolated, these volatile compounds can be evaluated as attractants to house flies and other fly species. Methods and Materials: A 240-mL aliquot of farm grade molasses was added to a 2-L round-bottomed flask along with 260 mL of a 3.1 M solution of NaCl in deionized water and 400 mL of either hexane or diethyl ether.

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This mixture was extracted overnight using a liquid-liquid extraction apparatus, and the extracts were concentrated to approximately 150 mL. The hexane and ethyl ether extracts were then exposed to flies in a laboratory setting, and both samples were attractive to the flies. A 1-mL aliquot from each of the extracts was analyzed along with appropriate solvent blanks using a Thermo Finnigan Trace GC/MS equipped with a DB-WAXetr column (30 m x 0.25 mm i.d., df = 0.25µm). Results: Several classes of organic compounds were tentatively identified in the molasses extracts including large concentrations of aliphatic carboxylic acids and ketones. Lesser concentrations of substituted phenols, amides, ketones, and aliphatic alcohols were also present in the sample. A diverse number of heterocycles were detected in the samples including pyrazines, pyrroles, pyrrolidines, furans, furanones, pyranones, and indoles. Cyclic carbonyls, aliphatic esters, and substituted benzenes were also identified. A listing of the components identified tentatively in molasses is presented and discussed in the poster. Standards have been obtained and these are currently being analyzed for positive identification of constituents. Individual compounds and compositions of blends will be tested for their attractiveness to house flies. Some of the major constituents identified tentatively in these analyses are labeled on Figure 1. This figure contains the chromatograms for the hexane and ether molasses extracts, respectively.